Volumes 41 and 42, 1993

January 5, 1993

1 Editorial

3 Review: Isolation, Renaturation, and Formation of Disulfide Bonds of Eukaryotic Proteins Expressed in *Escherichia coli* as Inclusion Bodies
B. Fischer, I. Sumner, and P. Goodenough

14 Improved Penicillin Amidase Production Using a Genetically Engineered Mutant of *Escherichia coli* ATCC 11105
N. Robas, H. Zouheiry, G. Branlant, and C. Branlant

25 Packed Bed Bioreactor with Porous Ceramic Beads for Animal Cell Culture
S. Park and G. Stephanopoulos

35 Classification of Plant Somatic Embryos by Computer Vision
J.J. Hämäläinen, U. Kurtén, and V. Kauppinen

43 Some Observations on Protease Production in Continuous Suspension Cultures of *Bacillus firmus*
S.-H. Moon and S.J. Parulekar

55 Effect of Oxygen and Ethanol on Recombinant Yeast Fermentation for Hepatitis B Virus Surface Antigen Production: Modeling and Simulation Studies
Y. Shi, D.D.Y. Ryu, and W.-K. Yuan

67 Evolutionary Operation (EVOP) to Optimize Three-Dimensional Biological Experiments
R. Banerjee and B.C. Bhattacharyya

72 Intensification of Mass Transfer in Aqueous Two-Phase Systems
S.V. Save, V.G. Pangarkar, and S.V. Kumar

79 Biodegradation of an Inhibitory Nongrowth Substrate (Nitroglycerin) in Batch Reactors
H. Pesari and D. Grasso

88 Enzymatic Production of Cyclodextrins from Milled Corn Starch in an Ultrafiltration Membrane Bioreactor
T.-J. Kim, Y.-D. Lee, and H.-S. Kim

95 The Effect of Organic Solvents on the Equilibrium Position of Enzymatic Acylglycerol Synthesis
A.E.M. Janssen, A. Van der Padt, H.M. Van Sonsbeek, and K. Van't Riet

104 Kinetic Characterization of Baculovirus-Induced Cell Death in Insect Cell Cultures
S.-C. Wu, B.E. Dale, and J.C. Liao

111 A Model of Biofilm Detachment
P.S. Stewart

118 Intracellular pH Based Controlled Cultivation of Yeast Cells: I. Measurement Methodology
G.K. Sureshkumar and R. Mutharasan

129 Kinetics and Modeling of Hexavalent Chromium Reduction in *Enterobacter cloacae*
K. Yamamoto, J. Kato, T. Yano, and H. Ohtake

134 Comparison of Maximum Production Rates and Optimum Operating/Design Parameters in Overloaded Elution and Displacement Chromatography
A. Felinger and G. Guiochon

148 Stability of Plasmid Vector pIJ303 in *Streptomyces lividans* TK24 during Laboratory-Scale Fermentations
C.A. Wrigley-Jones, H. Richards, C.R. Thomas, and J. Ward

Communications to the Editor

156 The Effect of Aqueous Surfactant Solutions on Alcohol Dehydrogenase (LADH)
A.L. Creagh, J.M. Prausnitz, and H.W. Blanch

162 Rheological Characterization of Media Containing *Penicillium chrysogenum*
A.G. Pedersen, M. Bundgaard-Nielsen, J. Nielsen, J. Villadsen, and O. Hassager

165 Yield of Poly-D(-)-3-Hydroxybutyrate from Various Carbon Resources: A Theoretical Study
T. Yamane

January 20, 1993

171 Improved Activity Retention of Enzymes Deposited on Solid Supports
E. Wehtje, P. Adlercreutz, and B. Mattiasson

179 Cultivation of Mammalian Cells as Aggregates in Bioreactors: Effect of Calcium Concentration on Spatial Distribution of Viability
M.V. Peshwa, Y.-S. Kyung, D.B. McClure, and W.-S. Hu

188 Cell-Cell Adhesion and Aggregation: Influence on the Growth Behavior of CHO Cells
W.A. Renner, M. Jordan, H.M. Eppenberger, and C. Leist

194 Evaluation of a Hepatocyte-Entrapment Hollow Fiber Bioreactor: A Potential Bioartificial Liver
S.L. Nyberg, R.A. Shatford, M.V. Peshwa, J.G. White, F.B. Cerra, and W.-S. Hu

204 Immobilization of Lipase for Effective Interesterification of Fats and Oils in Organic Solvent
S.-W. Cho and J.S. Rhee

211 Plasmid Retention and Gene Expression in Suspended and Biofilm Cultures of Recombinant *Escherichia coli* DH5α(pMJR1750)
C.-T. Huang, S.W. Peretti, and J.D. Bryers

221 Defined Media Optimization for Growth of Recombinant *Escherichia coli* X90
L. Yee and H.W. Blanch

231 Immobilized Catalase: Deactivation and Reactor Stability
P.T. Vasudevan and R.-H. Weiland

237 Production of the Siderophore Enterobactin: Use of Four Different Fermentation Systems and Identification of the Compound by HPLC
A. Seiffert, K. Goeke, H.-P. Fielder, and H. Zahner

245 In Vitro Production of *Bombyx mori* Silk Fibroin by Organ-Culture of the Posterior Silk Glands; Isotope Labeling and Fluorination of the Silk Fibroin
T. Asakura, R. Sakaguchi, M. Demura, T. Manabe, A. Uyama, K. Ogawa, and M. Osanai

253 Scaleup of Ajmalicine Production by Plant Cell Cultures of *Catharanthus roseus*
J.E. Schlatmann, A.M. Nuutila, W.M. van Gulik, H.J.G. ten Hoopen, R. Verpoorte, and J.J. Heijnen

263 Continuous Bioconversion of *n*-Octane to Octanoic Acid by Recombinant *Escherichia coli* (*alk*$^+$) Growing in a Two-Liquid Phase Chemostat
O. Favre-Bulle, E. Weenink, T. Vos, H. Preusting, and B. Witholt

273 Kinetics of Cell Growth and Heterologous Glucoamylase Production in Recombinant *Aspergillus nidulans*
W.-L. Lin, R.S. Feldberg, and E. De Bernardez Clark

280 Adsorption of BSA on QAE-Dextran: Equilibria
H. Yoshida, H. Nishihara, and T. Kataoka

February 5, 1993

287 Mini-Review: Industrial Separation of Carboxylic and Amino Acids by Liquid Membranes: Applicability, Process Considerations, and Potential Advantages
A.M. Eyal and E. Bressler

296 Measurement of Hydrodynamic Shear by Using a Dissolved Oxygen Probe
I.-H. Kim, M.H. Cho, and S.S. Wang

303 Biological Sulfuric Acid Transformation: Reactor Design and Process Optimization
G. Stucki, K.W. Hanselmann, and R.A. Hürzeler

316 Relieving Effects of Glycine and Methionine from Acetic Acid Inhibition in *Escherichia coli* Fermentation
K. Han, J. Hong, and H.C. Lim

325 Plasmid Burden in Chemostat Culture of *Escherichia coli:* Its Effect on the Selection for Overproducers of Host Enzymes
P. Kyslik, M. Dobisova, H. Maresova, and L. Sobotkova

330 Cell Culture Conditions Determine the Enhancement of Specific Monoclonal Antibody Productivity of Calcium Alginate-Entrapped S3H5/γ2bA2 Hybridoma Cells
G.M. Lee, A.S. Chuck, and B.O. Palsson

341 Formation of Microparticulate Protein Powders Using a Supercritical Fluid Antisolvent
S.-D. Yeo, G.-B. Lim, P.G. Debenedetti, and H. Bernstein

347 Startup of Anaerobic Fluidized Bed Reactors with Acetic Acid as the Substrate
Y. Hsu and W.K. Shieh

354 Mass Transport Parameters of Aspen Wood Chip Beds via Stimulus–Response Tracer Techniques
G. Hradil, J.M. Calo, and T.K. Wunderlich, Jr.

361 Application of Gravitational Sedimentation to Efficient Cellular Recycling in Continuous Alcoholic Fermentation
A.B.R.A. Maia and D.L. Nelson

370 Comparison of Substrate Utilization and Growth Kinetics Between Immobilized and Suspended *Pseudomonas* Cells
G.S. Shreve and T.M. Vogel

380 Monitoring and Modeling Density-Dependent Growth of Anchorage-Dependent Cells
R.-C. Ruaan, G.-J. Tsai, and G.-T. Tsao

Communication to the Editor

390 Are Water-Immiscibility and Apolarity of the Solvent Relevant to Enzyme Efficiency?
V. Satya Narayan and A.M. Klibanov

February 20, 1993

395 Variation and Modeling of the Probability of Plasmid Loss as a Function of Growth Rate of Plasmid-Bearing Cells of *Escherichia coli* During Continuous Cultures
R. Mosrati, N. Nancib, and J. Boudrant

405 Production of Cellobiose by Enzymatic Hydrolysis: Removal of β-Glucosidase from Cellulase by Affinity Precipitation Using Chitosan
T. Homma, M. Fujii, J.-I. Mori, T. Kawakami, K. Kuroda, and M. Taniguchi

411 Development of Bacterial Cytochrome P-450_{cam} (Cytochrome *m*) Production
J.B. Horowitz and V.L. Vilker

422 Calculation of Entropy Change Accompanying Growth of *Escherichia coli* K-12 on Succinic Acid
E.H. Battley

429 Effect of Dilution Rate on Growth, Productivity, Cell Cycle and Size, and Shear Sensitivity of a Hybridoma Cell in a Continuous Culture
D.E. Martens, C.D. de Gooijer, C.A.M. van der Velden-de Groot, E.C. Beuvery, and J. Tramper

440 Toward a Control of Lignin and Manganese Peroxidases Hypersecretion by *Phanerochaete chrysosporium* in Agitated Vessels: Evidence of the Superiority of Pneumatic Bioreactors on Mechanically Agitated Bioreactors
P. Bonnarme, M. Delattre, H. Drouet, G. Corrieu, and M. Asther

451 Analysis of Substrate Protection of an Immobilized Glucose Isomerase Reactor
J.-Y. Houng, H.Y. Yu, K.-C. Chen, and C. Tiu

459 Effect of Carbon Dioxide Concentration on the Bioleaching of a Pyrite–Arsenopyrite Ore Concentrate
S. Nagpal, D. Dahlstrom, and T. Oolman

465 Development of an Enzyme Membrane Reactor for Treatment of Cyanide-Containing Wastewaters from the Food Industry
S. Basheer, Ö.M. Kut, J.E. Prenosil, and J.R. Bourne

474 Enzymatic Activity Under Tangential Flow Conditions of Photochemically Grafted Membranes Containing Immobilized Catalase
E. Selli, A. D'Ambrosio, and I.R. Bellobono

479 Intrinsic Fermentation Kinetics of Lactose in Acidogenic Biofilms
J. Yu and K.L. Pinder

489 Reverse Micelles in Protein Separation: The Use of Silica for the Back-Transfer Process
M.E. Leser, K. Mrkoci, and P.L. Luisi

493 Fuzzy Control of Ethanol Concentration and its Application to Maximum Gluthathione Production in Yeast Fed-Batch Culture
C.G. Alfafara, K. Miura, H. Shimizu, S. Shioya, K. Suga, and K. Suzuki

March 5, 1993

503 Mathematical Modeling of Growth and Alkaloid Production in *Claviceps purpurea* Batch Fermentation
S. Miličić, J. Velušček, M. Kremser, and H. Sočič

512 Biofiltration of Methanol Vapor
Z. Shareefdeen, B.C. Baltzis, Y.-S. Oh, and R. Bartha

525 Air Slugs Entrapped Cross-Flow Filtration of Bacterial Suspensions
C.-K. Lee, W.-G. Chang, and Y.-H. Ju

531 Catalytic and Interfacial Aspects of Enzymatic Polymer Synthesis in Reversed Micellar Systems
A.M. Rao, V.T. John, R.D. Gonzalez, J.A. Akkara, and D.L. Kaplan

541 Continuous Measurement of Microbial Heat Production in Laboratory Fermentors
B.H.A. van Kleeff, J.G. Kuenen, and J.J. Heijnen

550 High Cell Density Cultivation of *Pseudomonas oleovorans*: Growth and Production of Poly(3-hydroxyalkanoates) in Two-Liquid Phase Batch and Fed-Batch Systems
H. Preusting, R. van Houten, A. Hoefs, E.K. van Langenberghe, O. Favre-Bulle, and B. Witholt

557 Enhancement of Recombinant Protein Synthesis and Stability via Coordinated Amino Acid Addition
D.M. Ramírez and W.E. Bentley

566 Dramatic Enhancement of Enzymatic Activity in Organic Solvents by Lyoprotectants
K. Dabulis and A.M. Klibanov

572 Dynamics of Phenol Degradation by *Pseudomonas putida*
P.J. Allsop, Y. Chisti, M. Moo-Young, and G.R. Sullivan

581 Production of Indole Alkaloids by Selected Hairy Root Lines of *Catharanthus roseus*
R. Bhadra, S. Vani, and J.V. Shanks

Communications to the Editor

593 Dynamics of Transcriptional and Translational Processes in Hepatocytes Cultured in a Collagen Sandwich
J.C.Y. Dunn, R.G. Tompkins, and M.L. Yarmush

599 Optimization of Fed-Batch Fermentors by Iterative Dynamic Programming
R. Luus

March 15, 1993

603 Action of Lipolytical Enzymes in Biphasic Organic-Aqueous Systems: Dynamics of the Irreversible Michaelis–Menten Reaction
S.-W. Tsai, H.-J. Wei, and C.-L. Chiang

612 Dissolution of Sulphur Particles by *Thiobacillus ferrooxidans*: Substrate for Unattached Cells
A. Shrihari, S.R. Bhavaraju, J.M. Modak, R. Kumar, and K.S. Gandhi

617 Factors Affecting the Performance of Crossflow Filtration of Yeast Cell Suspension
T. Tanaka, R. Kamimura, K. Itoh, K. Nakanishi, and R. Matsuno

625 Criteria to Assess When Biodegradation is Kinetically Limited by Intraparticle Diffusion and Sorption
G.-Y. Chung, B.J. McCoy, and K.M. Scow

633 Metabolic Flux Distribution in *Corynebacterium glutamicum* During Growth and Lysine Overproduction
J.J. Vallino and G. Stephanopoulos

647 Comparison of Glucose Fermentation by Suspended and Gel-Entrapped Yeast Cells: An In Vivo Nuclear Magnetic Resonance Study
M.A. Taipa, J.M. Cabral, and H. Santos

654 Enhancement Effect of Polyethylene Glycol on Enzymatic Synthesis of Cephalexin
C.K. Hyun, J.H. Choi, J.H. Kim, and D.D.Y. Ryu

659 Monitoring Glutamine in Animal Cell Cultures Using a Chemiluminescence Fiber Optic Biosensor
M.V. Cattaneo and J.H. Luong

Communications to the Editor

666 Effect of Oxygen Fluctuations on Recombinant *Escherichia coli* Fermentation
P.K. Namdev, N. Irwin, B.G. Thompson, and M.R. Gray

671 Mechanism of Microbial Flotation Using *Thiobacillus ferrooxidans* for Pyrite Suppression
N. Ohmura, K. Kitamura, and H. Saiki

677 Cell Retention Culture with an Internal Filter Module: Continuous Ethanol Fermentation
H.N. Chang, W.G. Lee, and B.S. Kim

682 Errata

March 25, 1993

685 A Comparison of Oxygenation Methods for High-Density Perfusion Cultures of Animal Cells
S. Zhang, A. Handa-Corrigan, and R.E. Spier

693 Phenol Removal from Waste Gases with a Biological Filter by *Pseudomonas putida*
M. Zilli, A. Converti, A. Lodi, M. Del Borghi, and G. Ferraiolo

700 Instability Caused by High Strength of Cheese Whey in UASB Reactor
J.Q. Yan, K.V. Lo, and K.L. Pinder

707 A Simple Genetically Structured Model of *trp* Repressor–Operator Interactions
B. T. Koh and M. G. S. Yap

715 A Simple Morphologically Structured Model Describing the Growth of Filamentous Microorganisms
J. Nielson

728 A Statistical Analysis of the Effect of Substrate Utilization and Shear Stress on the Kinetics of Biofilm Detachment
B. M. Peyton and W. G. Characklis

736 Diffusion of Lactose in Acidogenic Biofilms
J. Yu and K. L. Pinder

745 Rheological Properties of Mammalian Cell Culture Suspensions: Hybridoma and HeLa Cell Lines
Y. Shi, D. D. Y. Ryu, and R. Ballica

755 Diffusivity of Cu^{2+} in Calcium Alginate Gel Beads
D. Chen, Z. Lewandowski, F. Roe, and P. Surapaneni

April 5, 1993

761 An Ultrafiltration Membrane Bioreactor for the Lipolysis of Olive Oil in Reversed Micellar Media
D. M. F. Prazeres, F. A. P. Garcia, and J. M. S. Cabral

771 A Structured Model Describing Carbon and Phosphate Limited Growth of *Catharanthus roseus* Plant Cell Suspensions in Batch and Chemostat Culture
W. M. van Gulik, H. J. G. ten Hoopen, and J. J. Heijnen

781 Recombinant Trypsin Production in High Cell Density Fed-Batch Cultures of *Escherichia coli*
L. Yee and H. W. Blanch

791 A Simulation Model for the Continuous Production of Acetoin and Butanediol Using *Bacillus subtilis* with Integrated Pervaporation Separation
B. Dettwiler, I. J. Dunn, E. Heinzle, and J. E. Prenosil

801 Enhancement of Cloned Gene Product Synthesis via Autoselection in Recombinant *Saccharomyces cerevisiae*
S. J. Napp and N. A. Da Silva

811 Population and Biomass Kinetics in Fed-Batch Cultures of *Daucus carota L.* SomaticEmbryos
L.-C. Huang, C.-M. Chi, H. Vits, E. J. Staba, T. J. Cooke, and W.-S. Hu

819 Biosorption of Cadmium by Biomass of Marine Algae
Z. R. Holan, B. Volesky, and I. Prasetyo

Communications to the Editor

826 Cadmium Biosorption by *Saccharomyces cerevisiae*
B. Volesky, H. May, and Z. R. Holan

830 Computation of pH Evolution versus Ionic Products Concentration in a Fermentation Broth
C. Kennes, H. Naveau, and E.J. Nyns

833 The Adsorptive Immobilization of Phospholipase D Mediated by Calcium Ions
R. Lambrecht and R. Ulbrich-Hofmann

April 15, 1993

837 Broad Host Range, Regulated Expression System Utilizing Bacteriophage T7 RNA Polymerase and Promoter
N.C. Pagratis and H.R. Revel

846 Study of the Enzymatic Hydrolysis of Cellulose for Production of Fuel Ethanol by the Simultaneous Saccharification and Fermentation Process
G.P. Philippidis, T.K. Smith, and C.E. Wyman

854 Comparison of Three Different Promoter Systems for Secretory α-Amylase Production in Fed-Batch Cultures of Recombinant *Saccharomyces cerevisiae*
Y.S. Park, S. Shiba, S. Iijima, T. Kobayashi, and F. Hishinuma

862 Homogeneous Immunoassay of Polyclonal Antibodies by Use of Antigen-Coupled Liposomes
S. Katoh, Y. Sohma, Y. Mori, R. Fujita, E. Sada, M. Kishimura, and H. Fukuda

868 Fluid-Mechanical Forces in Agitated Bioreactors Reduce the CD13 and CD33 Surface Protein Content of HL60 Cells
S. Lakhotia, K.D. Bauer, and E.T. Papoutsakis

878 Purification and Characterization of a Highly Thermostable Glucose Isomerase Produced by the Extremely Thermophilic Eubacterium, *Thermotoga maritima*
S.H. Brown, C. Sjøholm, and R.M. Kelly

887 Factors Affecting Enzyme Characteristics of Bilirubin Oxidase Suspensions in Organic Solvents
E. Skrika-Alexopoulos and R.B. Freedman

894 Stability of Bilirubin Oxidase in Organic Solvent Media: A Comparative Study on Two Low-Water Systems
E. Skrika-Alexopoulos, J. Muir, and R.B. Freedman

900 Complete Design Analysis of a Continuous Sterilizer for Fermentation Media Containing Suspended Solids
P.M. Armenante and Y.S. Li

April 25, 1993

915 A Novel Membrane Bioreactor for Detoxifying Industrial Wastewater: I. Biodegradation of Phenol in a Synthetically Concocted Wastewater
A.G. Livingston

927 A Novel Membrane Bioreactor for Detoxifying Industrial Wastewater: II. Biodegradation of 3-Chloronitrobenzene in an Industrially Produced Wastewater
A.G. Livingston

937 Continuous, High Level Production and Excretion of a Plasmid-Encoded Protein by *Escherichia coli* in a Two-stage Chemostat
J. Fu, D.B. Wilson, and M.L. Shuler

947 Diffusion and Reaction within Porous Packing Media: A Phenomenological Model
W.L. Jones, J.D. Dockery, C.R. Vogel, and P.J. Sturman

957 Synthesis and Characterization of Soluble Concanavalin A Oligomer
C.M. Pai, H. Jacobs, Y.H. Bae, and S.W. Kim

964 Simultaneous Enzymatic/Electrochemical Determination of Glucose and L-Glutamine in Hybridoma Media by Flow-Injection Analysis
M.E. Meyerhoff, M. Trojanowicz, and B.O. Palsson

970 Issues in the Culture of the Extremely Thermophilic Methanogen, *Methanothermus fervidus*
C.B. Pepper and H.G. Monbouquette

979 Kinetic Resolution of Racemic Glycidyl Butyrate Using a Multiphase Membrane Enzyme Reactor: Experiments and Model Verification
D.R. Wu, S.M. Cramer, and G. Belfort

991 Affinity Precipitation of Proteins by Polyligands
J.E. Morris, A.S. Hoffman, and R.R. Fisher

Communications to the Editor

998 Pulsatile Flow Filtration of Yeast Cell Debris: Influence of Preincubation on Performance
D. Wu, J.A. Howell, and R.W. Field

1003 Productivity of Outdoor Algal Cultures in Unstable Weather Conditions
Y.-K. Lee and C.-S. Low

May 1993

1007 Influence of Mold Growth on the Pressure Drop in Aerated Solid State Fermentors
R. Auria, M. Morales, E. Villegas, and S. Revah

1014 Dimensionless Criteria for Estimating Oxygen Transfer in Aeration Systems
T. Ognean

1021 Kinetic Study of the Lipase-Catalyzed Synthesis of Triolein
R. Lortie, M. Trani, and F. Ergan

1027 Determining Sensitivity Coefficients Directly from Experimental Data
P.M. Schlosser, T. Holcomb, and J.E. Bailey

1039 Separation Albumin-PEG: Transmission of PEG Through Ultrafiltration Membranes
S. Lentsch, P. Aimar, and J.L. Orozco

1048 The Kinetics of Cometabolism
C.S. Criddle

1057 Kinetics of Competitive Inhibition and Cometabolism in the Biodegradation of Benzene, Toluene, and *p*-Xylene by Two *Pseudomonas* Isolates
M.-K. Chang, T.C. Voice, and C.S. Criddle

1066 Modeling and Optimization of Cloned Invertase Expression in *Saccharomyces cerevisiae*
A. Patkar, J.-H. Seo, and H. C. Lim

1075 Tropane Alkaloid Production in *Datura stramonium* Suspension Cultures: Elicitor and Precursor Effects
R. Ballica, D. D. Y. Ryu, and C. I. Kado

1082 Anaerobic Waste-Activated Sludge Digestion—A Bioconversion Mechanism and Kinetic Model
T. Shimizu, K. Kudo, and Y. Nasu

1092 Nutrient-Split Feeding Strategy for Dialysis Cultivation of *Escherichia coli*
J. C. Ogbonna and H. Märkl

1101 Affinity Thermoprecipitation: Contribution of the Efficiency of Ligand–Protein Interaction and Access of the Ligand
I. Yu. Galaev and B. Mattiasson

1107 A Novel BOD Sensor Based on Bacterial Luminescence
C.-K. Hyun, E. Tamiya, T. Takeuchi, I. Karube, and N. Inoue

1112 Mathematical Model for the Luminol Chemiluminescence Reaction Catalyzed by Peroxidase
L. Li, M. A. Arnold, and J. S. Dordick

1121 Experimental Determination of Flux Control Distribution in Biochemical Systems: In Vitro Model to Analyze Transient Metabolite Concentrations
J. Delgado, J. Meruane, and J. C. Liao

Communication to the Editor

1129 Determination of Kinetic Parameters of Fermentation Processes by a Continuous Unsteady-State Method: Application to the Alcoholic Fermentation of D-Xylose by *Pichia stipitis*
H. Dominguez, M. J. Núñez, R. Chamy, and J. M. Lema

June 5, 1993

1 Symmetric Branching Model for the Kinetics of Mycelial Growth
G. Viniegra-Gonzalez, G. Saucedo-Castañeda, F. López-Isunza, and E. Favela-Torres

11 Viability Testing and Characterization of Germination of Fungal Spores by Automatic Image Analysis
G. C. Paul, C. A. Kent, and C. R. Thomas

24 Transport and Intracellular Accumulation of Acetaldehyde in *Saccharomyces cerevisiae*
G. A. Stanley and N. B. Pamment

30 In Situ Fermentation Monitoring with Recombinant Firefly Luciferase
D. R Lasko and D. I. C. Wang

37 Effect of Fluorochrome Location in Protein A on Sensing Efficiency of IgG
P. Y. Huang and Cheng S. Lee

43 Regeneration of NADH in a Bioreactor Using Yeast Cells Immobilized in Alginate Fiber: I. Method and Effect of Reactor Variables
E. Stevenson, P. G. Ibbotson, and P. L. Spedding

50 Emulsion Liquid Membrane Extraction of Lactic Acid from Aqueous Solutions and Fermentation Broth
C. Schöller, J. B. Chaudhuri, and D. L. Pyle

59 Biochemical Production Capabilities of *Escherichia coli*
A. Varma, B. W. Boesch, and B. O. Palsson

74 Overexpression of Cloned Genes Using Recombinant *Escherichia coli* Regulated by a T7 Promoter: II. Two-Stage Continuous Cultures and Model Simulations
F. Miao and D. S. Kompala

81 Construction, Expression, and Analysis of Recombinant HIV gp41 Constructs Containing a Novel Cellular Binding Domain
D. P. Kestler, L. A. Henderson, and J. D. Noti

87 Solid-State Nuclear Magnetic Resonance Investigation of the Solvent Dependence of Tyrosyl Ring Motion in an Enzyme
P. A. Burke, R. G. Griffin, and A. M. Klibanov

95 Improved Protein Synthesis and Secretion Through Medium Enrichment in a Stable Recombinant Yeast Strain
Z. Wang and N. A. Da Silva

103 Esterification Reactions Catalyzed by Lipases in Microemulsions: The Role of Enzyme Localization in Relation to Its Selectivity
H. Stamatis, A. Xenakis, M. Provelegiou, and F. N. Kolisis

111 Transport of 1-μm Latex Particles in *Pseudomonas aeruginosa* Biofilms
W. J. Drury, P. S. Stewart, and W. G. Characklis

118 Comparison of Soluble and Immobilized Trypsin Kinetics: Implications for Peptide Synthesis
P. S. Sears and D. S. Clark

125 Sterilization of Varying Diameter Dead-Ended Tubes
J. H. Young

133 A Three-Phase Pattern in Growth, Monoclonal Antibody Production, and Metabolite Exchange in a Hybridoma Bioreactor Culture
M. E. Bushell, S. L. Bell, M. F. Scott, K. Snell, R. E. Spier, J. N. Wardell, and P. G. Sanders

Communications to the Editor

140 Micelle-Supported Electroenzymology: Succinate Dehydrogengation by *Escherichia coli* Fumerate Reductase in Decylubiquinone and Octyl Glucoside Micelles
K. T. Kinnear and H. G. Monbouquette

145 A Synergistic Kinetics Model for Enzymatic Cellulose Hydrolysis Compared to Degree-of-Synergism Experimental Results
A. O. Converse and J. D. Optekar

June 20, 1993

149 Effect of Operating Conditions on Solid Substrate Fermentation
J. Sargantanis, M. N. Karim, V. G. Murphy, D. Ryoo, and R. P. Tengerdy

159 A Mathematical Model for Dynamic Simulation of Anaerobic Digestion of Complex Substrates: Focusing on Ammonia Inhibition
I. Angelidaki, L. Ellegaard, and B. K. Ahring

167 Measurements of Conformational Changes During Adhesion of Lipid and Protein (Polylysine and S-Layer) Surfaces
D. Leckband, Y.-L. Chen, J. Israelachvili, H. Hollis Wickman, M. Fletcher, and R. Zimmerman

178 Immobilization of β-Galactosidase for Application in Organic Chemistry Using a Chelating Peptide
S. Piesecki, W.-Y. Teng, and E. Hochuli

185 Cell Retention–Chemostat Studies of Hybridoma Cells—Analysis of Hybridoma Growth and Metabolism in Continuous Suspension Culture on Serum-Free Medium
G. W. Hiller, D. S. Clark, and H. W. Blanch

196 Lipase Activity in Vesicular Systems: Characterization of *Candida cylindracea* Lipase and Its Activity in Polymerizable Dialkylammonium Surfactant Vesicles
E. W. J. Mosmuller, M. C. R. Franssen, and J. F. J. Engbersen

205 Fed-Batch Cultivation of Recombinant *Escherichia coli* JM103 and Production of the Fusion Protein SPA::EcoRI in a 60-L Working Volume Airlift Tower Loop Reactor
L. Brandes, X. Wu, J. Bode, J. I. Rhee, and K. Schügerl

215 Observations of Aerobic, Growing *Escherichia coli* Metabolism Using an On-Line Nuclear Magnetic Resonance Spectroscopy System
R. Chen and J. E. Bailey

222 Investigation of Subpopulation Heterogeneity and Plasmid Stability in Recombinant *Escherichia coli* via Simple Segregated Model
W. E. Bentley and O. E. Quiroga

Communications to the Editor

235 Production of Recombinant Proteins in High-Density Insect Cell Cultures
S. Reuveny, Y. J. Kim, C. W. Kemp, and J. Shiloach

240 Expression of Epoxide Hydrolase in Insect Cells: A Focus on the Infected Cell
M.-Y. Wang, V. Vakharia, and W. E. Bentley

247 Loss of Antibody Productivity Is Highly Reproducible in Multiple Hybridoma Subclones
S. E. Merrett and B. O. Palsson

251 Subzero Temperature Operating Biosensor Utilizing an Organic Solvent and Quinoprotein Glucose Dehydrogenase
K. Sode, S. Nakasono, M. Tanaka, and T. Matsunaga

255 A Bioassay of Thyrotrophin by Photografted Mammalian Cells onto Polymeric Supports
A. D'Ambrosio, I. Renato Bellobono, F. Marangoni, P. Rebulla, and G. Sirchia

260 Some Factors Determining Protein Aggregation during Ultrafiltration
K. J. Kim, V. Chen, and A. G. Fane

July 1993

267 Analytical Effectiveness Calculations Concerning the Degradation of an Inhibitive Substrate by a Steady-State Biofilm
C. J. van Ede, A. M. Bollen, and A. A. C. M. Beenackers

279 Image Analysis to Quantify and Measure UASB Digester Granules
B. T. Dudley, A. R. Howgrave-Graham, A. G. Bruton, and F. M. Wallis

284 Determination of Cellular Rate Distributions in Microbial Cell Populations: Feeding Rates of Ciliated Protozoa
C. Hatzis, P.J. Sweeney, F. Srienc, and A.G. Fredrickson

295 Intracellular pH-Based Controlled Cultivation of Yeast Cells: II. Cultivation Methodology
G.K. Sureshkumar and R. Mutharasan

303 Gluco-Oligosaccharide Synthesis by Free and Immobilized β-Glucosidase
C. Revet, D. Thomas, and M.D. Legoy

309 Esterification of *N*-Benzyloxycarbonyldipeptides in Ethanol–Water with Immobilized Papain
K. Kawashiro, H. Ishizaki, S. Sugiyama, and H. Hayashi

315 Activated Sludge Process Performance Using a Multistage Tower Aeration Tank
T. Shimizu, K. Kudo, and Y. Nasu

326 Synthesis of Fatty Acid Esters by a Recombinant Cutinase in Reversed Micelles
M.J. Sebastião, J.M.S. Cabral, and M.R. Aires-Barros

333 Charged Fusions for Selective Recovery of β-Galactosidase from Cell Extract Using Hollow Fiber Ion-Exchange Membrane Adsorption
M.H. Heng and C.E. Glatz

339 Production of tPA in Recombinant CHO Cells Under Oxygen-Limited Conditions
A.A. Lin, R. Kimura, and W.M. Miller

351 Microencapsulation Selection for Isolation of Yeast Mutants with Increased Secretion of *Aspergillus awamori* Glucoamylase
K.D. Wittrup, A.L. Weber, and P. Tsai

357 A Two-Stage Bioreactor System for the Production of Recombinant Proteins Using a Genetically Engineered Baculovirus/Insect Cell System
J. Zhang, N. Kalogerakis, L.A. Behie, and K. Iatrou

367 Kinetic Models for Synthesis by a Thermophilic Alcohol Dehydrogenase
J.B. Ford, K.J. Askins, and K.B. Taylor

376 Neural Network Modeling of Batch Cell Growth Pattern
M.-J. Syu and G.T. Tsao

381 The Molecular Weight Cut-Off of Microcapsules Is Determined by the Reaction Between Alginate and Polylysine
G.M.R. Vandenbossche, P. Van Oostveldt, J. Demeester, and J.-P. Remon

387 A Model System for a Fluorometric Biosensor Using Permeabilized *Zymomonas mobilis* or Enzymes with Protein Confined Dinucleotides
O. Thordsen, S.J. Lee, A. Degelau, T. Scheper, H. Loos, B. Rehr, and H. Sahm

Communications to the Editor

394 Immobilization of Enzyme onto Cellulose–Titanium Oxide Composite Fiber
Y. Kurokawa, T. Sano, H. Ohta, and Y. Nakagawa

398 Bioconversion of Lactose/Whey to Fructose Diphosphate with Recombinant *Saccharomyces cerevisiae* Cells
C. Compagno, A. Tura, B.M. Ranzi, and E. Martegani

401 The Cellulose-Binding Domain (CBD_{Cex}) of an Exoglucanase from *Cellulomonas fimi:* Production in *Escherichia coli* and Characterization of the Polypeptide
E. Ong, N.R. Gilkes, R.C. Miller, Jr., R.A.J. Warren, and D.G. Kilburn

410 Generation of a pH Gradient in an Immobilized Enzyme System
J.B. Byers, M.B. Shah, R.L. Fournier, and S. Varanasi

421 Detection of Bacterial Contamination in Cultures of Eucaryotic Cells by Gas Chromatography–Mass Spectrometry
I. Elmroth, A. Fox, O. Holst, and L. Larsson

430 Monoclonal Antibody Productivity and the Metabolic Pattern of Perfusion Cultures Under Varying Oxygen Tensions
Y. Shi, D.D.Y. Ryu, and S.H. Park

440 Transport of Sugars Via Two Anomer-Specific Sites on Mannose-Phosphotransferase System in *Lactococcus cremoris:* In Vivo Study of Mechanism, Kinetics, and Adaptation
S. Benthin, J. Nielsen, and J. Villadsen

449 Alginate–Chitosan Coacervation in Production of Artificial Seeds
L.-F. Tay, L.-K. Khoh, C.-S. Loh, and E. Khor

455 Stabilization of Heterodimeric Enzyme by Multipoint Covalent Immobilization: Penicillin G Acylase from *Kluyvera citrophila*
J.M. Guisán, G. Alvaro, R. Fernandez-Lafuente, C.M. Rosell, J.L. Garcia, and A. Tagliani

465 Lipase Catalyzed Esterification of Glycidol in Organic Solvents
J.F. Martins, M.N. da Ponte, and S. Barreiros

469 A New Approach for Modeling Cellulase–Cellulose Adsorption and the Kinetics of the Enzymatic Hydrolysis of Microcrystalline Cellulose
B. Nidetzky and W. Steiner

480 Controlled Release Process to Recover Heterologous Glycosylphosphatidylinositol Membrane Anchored Proteins from CHO Cells
M.L. Kennard, M.R. Food, W.A. Jefferies, and J.M. Piret

487 Development of a Recovery and Recycle Process for a Pseudomonas Lipase Used for Large-Scale Enzymatic Synthesis
B.H. Junker, M. Bhupathy, and B.C. Buckland

494 Immobilized *Coffea arabica* Cell Culture Using a Bubble-Column Reactor with Controlled Light Intensity
H. Kurata and S. Furusaki

503 Enhanced Recovery of Solavetivone from *Agrobacterium* Transformed Root Cultures of *Hyoscyamus muticus* Using Integrated Product Extraction
J.P. Corry, W.L. Reed, and W.R. Curtis

509 A Thermodynamically Based Correlation for Maintenance Gibbs Energy Requirements in Aerobic and Anaerobic Chemotrophic Growth
L. Tijhuis, M.C.M. van Loosdrecht, and J.J. Heijnen

520 Improvement of shikonin productivity in Lithospermum erythrorhizon cell culture by alternating feeding of carbon and nitrogen
V. Srinivasan and D.D.Y. Ryu

527 Extractive Separation of Penicillin G by Facilitated Transport Via Carrier Supported Liquid Membranes
C.-J. Lee, H.-J. Yeh, W.-J. Yang, and C.-R. Kan

Communications to the Editor

535 Electric Prompting and Control of Dentrification
Y. Sakakibara and M. Kuroda

538 Microbial Utilization of Levoglucosan in Wood Pyrolysate as a Carbon and Energy Source
E.M. Prosen, D. Radlein, J. Piskorz, D.S. Scott, and R.L. Legge

542 On-Line Monitoring of Cell Concentration of *Perilla frutescens* in a Bioreactor
J.-J. Zhong, K. Fujiyama, T. Seki, and T. Yoshida

547 Errata

August 20, 1993

549 The Yield Equations in the Modeling and Control of Bioprocesses
G.F. Andrews

557 Use of a Simple Mathematical Model to Predict the Behavior of *Escherichia coli* Overproducing β-Lactamase Within Continuous Single- and Two-Stage Reactor Systems
A.P. Togna, J. Fu, and M.L. Shuler

571 A Fractal Model for the Characterization of Mycelial Morphology
D.B. Patankar, T.-C. Liu, and T. Oolman

579 Optimization of Hepatocyte Attachment to Microcarriers: Importance of Oxygen
B.D. Foy, J. Lee, J. Morgan, M. Toner, R.G. Tompkins, and M.L. Yarmush

589 Microbial Degradation of Quinoline: Kinetic Studies with *Comamonas acidovorans* DSM 6426
R. Miethling, V. Hecht, and W.-D. Deckwer

596 Partitioning Behavior and Enrichment of Proteins with Reversed Micellar Extraction: I. Forward Extraction of Proteins from Aqueous to Reversed Micellar Phase
T. Nishiki, I. Sato, T. Kataoka, and D. Kato

601 Substantial Overproduction of Antibodies by Applying Osmotic Pressure and Sodium Butyrate
S.K.W. Oh, P. Vig, F. Chua, W.K. Teo, and M.G.S. Yap

611 Effect of Surfactants on Cellulose Hydrolysis
S.S. Helle, S.J.B. Duff, and D.G. Cooper

618 Enantioselective Synthesis of Ibuprofen Esters in AOT/Isooctane Microemulsions by *Candida cylindracea* Lipase
G. Hedström, M. Backlund, and J.P. Slotte

625 Fatty Acid Production Characteristics of Fungi with Particular Emphasis on Gamma Linolenic Acid Production
M.J. Kennedy, S.L. Reader, and R.J. Davies

635 Cultivation of Virus Antigen in Fibroblast Cells Using a Glass Fiber Bed Reactor
B.H. Junker, T. Chiou, D.I.C. Wang, and B.C. Buckland

643 Competition Between Two Microbial Populations in a Sequencing Fed-Batch Reactor: Theory, Experimental Verification, and Implications for Waste Treatment Applications
S. Dikshitulu, B.C. Baltzis, and G.A. Lewandowski

657 Optimization of Alkyl β-D-Galactopyranoside Synthesis from Lactose Using Commercially Available β-Galactosidases
D.E. Stevenson, R.A. Stanley, and R.H. Furneaux

667 Gas Phase Acetaldehyde Production in a Continuous Bioreactor
S.O. Hwang, D.J. Trantolo, and D.L. Wise

674 Erratum

September 5, 1993

675 Response Dynamics of 26-, 34-, 39-, 54-, and 80-kDa Proteases in Induced Cultures of Recombinant *Escherichia coli*
S.W. Harcum and W.E. Bentley

686 Analysis of Metabolic Fluxes in Batch and Continuous Cultures of *Bacillus subtilis*
A. Goel, J. Ferrance, J. Jeong, and M.M. Ataai

697 Utilization of Glucose and Amino Acids in Insect Cell Cultures: Quantifying the Metabolic Flows within the Primary Pathways and Medium Development
J.P. Ferrance, A. Goel, and M.M. Ataai

708 A Single-Cell Assay of β-Galactosidase in Recombinant *Escherichia coli* Using Flow Cytometry
F. Miao, P. Todd, and D.S. Kompala

716 Prevascularization of Porous Biodegradable Polymers
A.G. Mikos, G. Sarakinos, M.D. Lyman, D.E. Ingber, J.P. Vacanti, and R. Langer

724 Oxygen Transfer in a Pulse Bioreactor
P.B. Monahan and M.T. Holtzapple

729 Carbon and Energy Balances in Cell-Recycle Cultures of *Schizosaccharomyces pombe*
J.L. Uribelarrea, H. De Queiroz, G. Goma, and A. Pareilleux

737 Optimal Operating Policy of the Ultrafiltration Membrane Bioreactor for Enzymatic Hydrolysis of Cellulose
S.-G. Lee and H.-S. Kim

747 Toxicity of Homologous Series of Organic Solvents for the Gram-Positive Bacteria *Arthrobacter* and *Nocardia* Sp. and the Gram-Negative Bacteria *Acinetobacter* and *Pseudomonas* Sp.
M. Vermüe, J. Sikkema, A. Verheul, R. Bakker, and J. Tramper

759 Modeling Lipolysis in a Reversed Micellar System: Part I. Conventional Batch Reactor
D.M.F. Prazeres, F. Lemos, F.A.P. Garcia, and J.M.S. Cabral

765 Modeling Lipolysis in a Reversed Micellar System: Part II. Membrane Reactor
D.M.F. Prazeres, F. Lemos, F.A.P. Garcia, and J.M.S. Cabral

Communications to the Editor

772 Pressure Affects Enzyme Function in Organic Media
J. Kim and J.S. Dordick

777 Morphological Measurements on *Penicillium chrysogenum* Broths by Rheology and Filtration Methods
T. Liu and D. Yu

785 Removal of Lead from Aqueous Solutions by *Penicillium* Biomass
H. Niu, X.S. Xu, J.H. Wang, and B. Volesky

788 Lipase-Catalyzed Acylation of Sugars Solubilized in Hydrophobic Solvents by Complexation
I. Ikeda and A.M. Klibanov

September 20, 1993

793 Improvement of Shikonin Productivity in *Lithospermum erythrorhizon* Cell Culture by Alternating Carbon and Nitrogen Feeding Strategy
V. Srinivasan and D.D.Y. Ryu

800 Effect of Water Activity on Enzymatic Synthesis of Cephalexin
C.K. Hyun, J.H. Kim, and D.D.Y. Ryu

807 Numerical and Monte Carlo Simulations of Phenolic Polymerizations Catalyzed by Peroxidase
K. Ryu, J.P. McEldoon, A.R. Pokora, W. Cyrus, and J.S. Dordick

815 Application of Computer to Monitoring and Control of Fermentation Process: Microbial Conversion of ML-236B Na to Pravastatin
M. Hosobunchi, K. Kurosawa, and H. Yoshikawa

821 Lipase Immobilized on Hydrophobic Porous Polymer Supports Prepared by Concentrated Emulsion of Polymerization and Their Activity in the Hydrolysis of Triacylglycerides
E. Ruckenstein and X. Wang

829 Application of Continuous Zone Electrophoresis to Preparative Separation of Proteins
S. Nath, H. Schütte, H. Hustedt, and W.-D. Deckwer

836 Stimulation of Acid Phosphatase Induction in *Saccharomyces cerevisiae* by Electrochemical Modulation of Effector Concentration
T. Haruyama, E. Kobatake, Y. Ikariyama, and M. Aizawa

843 An Integrated Metabolic Approach to Describe the Energy Efficiency of *Escherichia coli* Fermentations under Oxygen-Limited Conditions: Cellular Energetics, Carbon Flux, and Acetate Production
Y.-F. Ko, W.E. Bentley, and W.A. Weigand

854 Removal of Phenols from Wastewater by Soluble and Immobilized Tyrosinase
S. Wada, H. Ichikawa, and K. Tatsumi

859 TCE Degradation in a Methanotrophic Attached-Film Bioreactor
D.E. Fennell, Y.M. Nelson, S.E. Underhill, T.E. White, and W.J. Jewell

873 Bioenergetics and End-Product Regulation of *Clostridium thermosaccharolyticum* in Response to Nutrient Limitation
P.W. Hill, T.R. Klapatch, and L.R. Lynd

884 Perfusion Strategy for Rosmarinic Acid Production by *Anchusa officinalis*
W. W. Su, F. Lei, and L. Y. Su

891 A Two-Plane Tubular Photobioreactor for Outdoor Culture of *Spirulina*
G. Torzillo, P. Carlozzi, B. Pushparaj, E. Montaini, and R. Materassi

899 Adsorption of *Clostridium thermocellum* Cellulases onto Pretreated Mixed Hardwood, Avicel, and Lignin
T. D. Bernardez, K. Lyford, D. A. Hogsett, and L. R. Lynd

October 1993

909 Review: Tissue Engineering: Reconstitution of Human Hematopoiesis Ex Vivo
M. R. Koller and B. O. Palsson

931 Kinetic Study of Lipase Catalyzed Esterification Reactions in Water-in-Oil Microemulsions
H. Stamatis, A. Xenakis, U. Menge, and F. N. Kolisis

938 Activity of Mushroom Polyphenol Oxidase in Organic Medium
S. G. Burton, J. R. Duncan, P. T. Kaye, and P. D. Rose

945 Construction and Evaluation of a Metal Ion Biosensor
L. Tescione and G. Belfort

953 Solvent Effects on Lipase-Catalyzed Esterification of Glycerol and Fatty Acids
A. E. M. Janssen, A. Van der Padt, and K. Van't Riet

963 A Numerical Analysis of Forces Exerted by Laminar Flow on Spreading Cells in a Parallel Plate Flow Chamber Assay
L. A. Olivier and G. A. Truskey

974 Molecular Integrity of Monoclonal Antibodies Produced by Hybridoma Cells in Batch Culture and in Continuous-Flow Culture with Integrated Product Recovery
S. B. Mohan, S. R. Chohan, J. Eade, and A. Lyddiatt

987 Estimation of Disruption of Animal Cells by Turbulent Capillary Flow
Z. Zhang, M. Al-Rubeai, and C. R. Thomas

994 Hydrodynamics and Mixing in a Multiple Air-Lift Loop Reactor
W. A. M. Bakker, H. J. L. van Can, J. Tramper, and C. D. de Gooijer

1002 Activity Studies of Eight Purified Cellulases: Specificity, Synergism, and Binding Domain Effects
D. C. Irwin, M. Spezio, L. P. Walker, and D. B. Wilson

Communication to the Editor

1014 Surfactant-Induced Hydrogen Production in Cyanobacteria
M. Famiglietti, A. Hochkoeppler, and P. L. Luisi

November 5, 1993

1019 Engineering Cellulase Mixtures by Varying the Mole Fraction of *Thermomonospora fusca* E5 and E3, *Trichoderma reesei*, CBHI, and *Caldocellum saccharolyticum* β-Glucosidase
L. P. Walker, C. D. Belair, D. B. Wilson, and D. C. Irwin

1029 Temperature Control of Growth and Productivity in Mutant Chinese Hamster Ovary Cells Synthesizing a Recombinant Protein
N. Jenkins and A. Hovey

1037 Immobilization of Glucose Oxidase in Thin Polypyrrole Films: Influence of Polymerization Conditions and Film Thickness on the Activity and Stability of the Immobilized Enzyme
N. F. Almeida, E. J. Beckman, and M. M. Ataai

1046 Correlation of *Aspergillus niger* Broth Theological Properties with Biomass Concentration and the Shape of Mycelial Aggregates
E. Olsvik, K. G. Tucker, C. R. Thomas, and B. Kristiansen

1053 Metabolic Engineering of *Clostridium acetobutylicum* ATCC 824 for Increased Solvent Production by Enhancement of Acetone Formation Enzyme Activities Using a Synthetic Acetone Operon
L. D. Mermelstein, E. T. Papoutsakis, D. J. Petersen, and G. N. Bennett

1061 Effect of Shear on the Inactivation Kinetics of the Enzyme Dextransucrase
R. W. Lencki, A. Tecante, and L. Choplin

1068 A Simple Model for the Optimization of the Extraction Yield of Antibiotics Isolated from Fermented Broths by Direct Crystallization
J. P. Cardoso

1077 The Effect of the Dilution Rate on CHO Cell Physiology and Recombinant Interferon-γ Production in Glucose-Limited Chemostat Culture
P. M. Hayter, E. M. A. Curling, M. L. Gould, A. J. Baines, N. Jenkins, I. Salmon, P. G. Strange, and A. T. Bull

1086 Study on Separation of Conalbumin and Lysozyme from High Concentration Fresh Egg White at High Flow Rates by a Novel Ion-Exchanger
F. Ming, J. Howell, F. Acosta, and J. Hubble

1091 Production of Propionic Acid from Whey Permeate by Sequential Fermentation, Ultrafiltration, and Cell Recycling
A. Colomban, L. Roger, and P. Boyaval

1099 Protein Adsorption in Polysulfone Hollow Fiber Bioreactors Used for Serum-Free Mammalian Cell Culture
A. Y. Patkar, B. D. Bowen, and J. M. Piret

1107 Production of *Bacillus thuringiensis* Spores in Total Cell Retention Culture and Two-Stage Continuous Culture Using an Internal Ceramic Filter System
B. C. Kang, S. Y. Lee, and H. N. Chang

1113 Foreign Gene Expression (β-Galactosidase) During the Cell Cycle Phases in Recombinant CHO Cells
M. B. Gu, P. Todd, and D. S. Kompala

Communications to the Editor

1124 Comments on "In Search of a Thermodynamic Description of Biomass Yields for the Chemotrophic Growth of Microorganisms"
J. A. Roels

1127 Response to Comments on "In Search of a Thermodynamic Description of Biomass Yields for the Chemotrophic Growth of Microorganisms"
J. J. Heijnen and J. P. van Dijken

1131 Stability of Antibody Productivity Is Improved when Hybridoma Cells Are Entrapped in Calcium Alginate Beads
G. M. Lee and B. O. Palsson

November 20, 1993

1137 Peroxidase and Laccase as Catalysts for Removal of the Phenylhydrazide Protecting Group under Mild Conditions
A. N. Semenov, I. V. Lomonosova, V. I. Berezin, and M. I. Titov

1142 Enhanced Production of α-Amylase in Fed-Batch Cultures of *Bacillus subtilis* TN106(pAT5)
J. Lee and S. J. Parulekar

1151 Efficiency of Fatty Acid Synthesis by Oleaginous Yeasts: Prediction of Yield and Fatty Acid Cell Content from Consumed C/N Ratio by a Simple Method
L-M. Granger, P. Perlot, G. Goma, and A. Pareilleux

1157 Membrane Formation by Interfacial Cross-Linking of Chitosan for Microencapsulation of *Lactococcus lactis*
A. F. Groboillot, C. P. Champagne, G. D. Darling, D. Poncelet, and R. J. Neufeld

1164 Factors Affecting Bio-Oxidation of Sulfide Minerals at High Concentrations of Solids: A Review
A. D. Bailey and G. S. Hansford

1175 Self-Cycling Fermentation in a Stirred Tank Reactor
G. P. van Walsum and D. G. Cooper

1181 Effects of Rheological Properties and Mass Transfer on Plant Cell Bioreactor Performance: Production of Tropane Alkaloids
R. Ballica and D. D. Y. Ryu

1190 Real-Time Compensation of the Inner-Filter Effect in High-Density Bioluminescent Cultures
K. B. Konstantinov, P. Dhurjati, T. Van Dyk, W. Majarian, and R. LaRossa

1199 Affinity–Based Reversed Micellar Protein Extraction: I. Principles and Protein–Ligand Systems
B. D. Kelley, D. I. C. Wang, and T. A. Hatton

1209 Affinity-Based Reversed Micellar Protein Extraction: II. Effect of Cosurfactant Tail Length
B. D. Kelley, D. I. C. Wang, and T. A. Hatton

1218 Step-Fortifications of Nutrients in Mammalian Cell Culture
E.-C. Jo, D.-I. Kim, and H. M. Moon

1229 Repeated Fed-Batch Culture of Hybridoma Cells in Nutrient-Fortified High-Density Medium
E.-C. Jo, H. J. Park, D.-I. Kim, and H. M. Moon

1238 Adsorption–Desorption of Recombinant Hepatitis B Surface Antigen (r-HBsAg) from *P. pastoris* on a Diatomaceous Earth Matrix: Optimization of Parameters for Purification
A. Agraz, Y. Quiñones, N. Expósito, F. Breña, J. Madruga, E. Pentón, and L. Herrera

1245 Estimation of Melting Curves from Enzymatic Activity–Temperature Profiles
D. J. Hei and D. S. Clark

1252 Design of a Biomedical Reactor for Plasma Low-Density Lipoprotein Removal
S. D. Shefer, R. G. Payne, and R. Langer

December 1993

1263 Optimization of 2,3-Butanediol Production by *Klebsiella oxytoca* Through Oxygen Transfer Rate Control
P.B. Beronio, Jr. and G.T. Tsao

1270 An Energetic Model for Oxygen-Limited Metabolism
P.B. Beronio, Jr. and G.T. Tsao

1277 Growth Rate Effects on Fundamental Transport Properties of Bacterial Populations
J.R. Mercer, R.M. Ford, J.L. Stitz, and C. Bradbeer

1287 On-Line Monitoring of Monoclonal Antibodies in Animal Cell Culture Using a Grating Coupler
R. Polzius, F.F. Bier, U. Bilitewski, V. Jäger, and R.D. Schmid

1293 Transfer Vectors for Maximal Expression of Passenger Genes in the *Bombyx mori* Nuclear Polyhedrosis Virus Expression System
R.R. Johnson, D. Schmiel, K. Iatrou, and L. Gedamu

1301 Multigradient Method for Optimization of Slow Biotechnological Processes
J. Tammisola, H. Ojamo, and V. Kauppinen

1311 On the Applicability of Adaptive Bioprocess State Estimators
P.A. Lant, M.T. Tham, and G.A. Montague

1322 Growth and Production Modeling in Hybridoma Continuous Cultures
L. Cazzador and L. Mariani

1331 Rapid Purification of Despro(2)-Val 15-Leu 17-Aprotinin from the Culture Broth of a Recombinant *Saccharomyces cerevisiae*
T. Barthel and M.-R. Kula

1337 Use of ATP to Characterize Biomass Viability in Freely Suspended and Immobilized Cell Bioreactors
P. Gikas and A.G. Livingston

1352 Morphological Characterization of Yeast by Image Analysis
M.N. Pons, H. Vivier, J.F. Rémy, and J.A. Dodds

1360 High Tolerance of Methanogens in Granular Sludge to Oxygen
M.T. Kato, J.A. Field, and G. Lettinga

1367 In Appreciation

1371 Index to Volumes 41 and 42